The Boston Computer Society

SINCLAIR-TIMEX USER GROUP NEWSLETTER

Volume 2, Issue 7 July 1983

This newsletter is produced to inform group members of the agenda and logistics for future meetings, as well as to recap and amplify the information provided at the last meeting. It also provides a forum for members and interested parties to communicate what they have learned or developed relating to Sinclair and Timex computer products. Meetings are open to the public; however, attendees are encouraged to join the Boston Computer Society (BCS). This newsletter is free to members. Back issues are one dollar each.

USER GROUP MEETING

Date: Wednesday, July 20, 1983
Time: 7:00 p.m.
Place: Large Science Auditorium
UMass, Harbor Campus
(Directions on last page)

At the July meeting, Arman Toorians from Intercomputer, Inc., Boston, Massachusetts will demonstrate two products that Intercomputer has developed. Both products are related to real-world applications for the computer. The first is a controller used to turn on and off 110-Volt appliances, such as lights. The second is a expansion module made for the controller and other products marketed by Intercomputer.

FUTURE MEETINGS

We meet every month on the third Wednesday. The August meeting will be on the 18th. Allan Cohen has kindly volunteered to help coordinate speakers for the meetings. If you have items to discuss at this or future meetings or suggestions for presentations, please contact Sue Mahoney or Allan Cohen. Allan can be reached at 961-3453. If he is not at home, leave a message on his answering machine.

CONGRATULATIONS CLIFF!

With this issue of the newsletter, Cliff Danielson (photo above) starts his second year as editor. Cliff also has a nice 2-page article in the June issue of Computers 83, a biannual publication of Mechanix Illustrated. Much of what he said has previously appeared in this newsletter. Speaking of anniversaries, any ideas for the October meeting?

HIGHLIGHTS OF LAST MEETING

Sue Mahoney opened the meeting with an update on the status of the new Timex computers. She said the TS-1500 and the TS-2000 series would be shipped to the distributors in August. The TS-1500 is an upgraded version of the TS-1000. It has movable keys and 16 K of built-in RAM memory. Sue said she has seen an engineering model of the TS-2000, now called the TS-2068. This computer will have 48 K of RAM, color, sound, a monitor (as well as television) interface, and a lot more. The computer will allow a 64 character display using a monitor. Plans for a 16 K model, called the TS-2048, have been shelved. Sue's hoping to be able to show production units at the July meeting. Finally, Timex is currently not writing new software for the TS-1000 and TS-1500. Sue said most of the software efforts are aimed at the TS-2068. However, Timex is marketing second party TS-1000 software, and it currently has over eighty titles.

Dave Miller gave a very informative review of two high speed tape loading programs--Fastload and QSAVE. These products save programs in such a way as to make loading the programs much faster. Dave has used both programs, and has made numerous improvements to them. He has found that neither product ameliorates problems in loading tape. But this is to be expected, since, in general, it is harder, not easier, to load tapes at a faster speed. For the details, see Dave's article. Fastload is available from Gladstone Electronics for $19.95. QSAVE, which comes with an electronic filter, is available from a number of sources for $37.95.

Bill Russell (see photo), leader of the Central Pennsylvania Timex/Sinclair Computer Users Group, also gave a presentation. He described how he unexpectedly landed in the electronics business by creating the Winky Board. He said the passive (i.e., no power required) device plugs into your tape recorder to produce easier tape loading. It also has other functions, such as a tape duplicating capability and an earphone eavesdropper. The company, G. Russell, is named after Bill's wife, who is doing all of the marketing. Bill's group in Pennsylvania is also developing other products to be marketed by G. Russell. These include a program that protects files, a high speed loader, high-resolution print graphics, and a least-squares linear regression analysis program.

Other activities at the meeting included:

- Joe Gladstone of Gladstone Electronics and publisher of Timex Sinclair User attended the meeting and gave out complementary copies of his new magazine.

- Will Stackman announced that a company named TapeX in Boston was offering C5, C10, and C30 tapes with quantity discounts. In small quantities, a tape with box and label can be purchased for about $1.

- Sue suggested people call Jordan Kahn Company Inc. in Framingham to get information on the availability of Timex computers and supplies in the Boston area. Jordan Kahn is the New England district manager for the Timex Computer Corporation. The number is (617) 620-1133.

HIGHLIGHTS -- Continued

- Printer paper is available, by mail order, from Timex in Little Rock, Arkansas. Call the Timex information number, 800-24-TIMEX, for details. Reportedly, paper is also available locally, from Cambridge Paper Company and Manufactures' Marketplace in West Roxbury.

- BNF Enterprises in Peabody has been selling old, damaged computers and memories very cheaply. The computer, which sold for $9.95, is sold out. However, 16 K RAM packs, without the case, are selling for $6.95 (3 for $18.00), and reportedly 5 out of 6 actually work. Call (617) 531-5774.

OCTOPUS CREDIT

The last issue of the newsletter featured an octopus on the first page. "How does an octopus relate to our computer?" you may ask. Have you looked at your system recently? With all the perpherals and cabling, our computer resembles an octopus. This is not unique to the Sinclair-Timex, however. Other microcomputer systems, and even hi-fi component systems, suffer the same maladroitness. The octopus was sketched for the newsletter by Joe Hamel from New Bedford, Massachusetts, as a favor to member Bob Dyl.

ARITHMETIC DISCREDIT

There were two math mistakes in the last newsletter--so much for proofreading. In "Knowing Left From Right" we told you 4+2*3 obviously equals 18. In the TS-1500 article, we said there are 8 bits of bank switching, giving 8+16=24 total address bits. This means there are 2**24, or 16*(2**20), or 16 megabytes of addressability (not 64).

FIREWORKS

If you LET C$="JULY" and PRINT C$(LEN C$/4) + " FIREWORKS" you will get a "Fourth" of July Fireworks. The following program, written by Jack Hodgson, also has fireworks.

```
110 LET B=5
120 FOR A=15 TO 4 STEP -1
130 PRINT AT A,B;"O"
132 PRINT AT A,B;" "
135 LET B=B+1
140 NEXT A
150 PRINT AT 4,16;"*"
160 PRINT AT 3,15;"* *"
170 PRINT AT 5,15;"* *"
180 PRINT AT 2,13;"**   **"
190 PRINT AT 6,14;"*   *"
200 PRINT AT 1,11;"**       **"
210 PRINT AT 7,14;"*    *";AT 8
,13;"*      *";AT 9,12;"*
 *"
220 PRINT AT 2,10;"*  **   ** *
";AT 10,11;"*         *"
230 LET C$="G900X+3SG+NE+ITKX"
240 FOR Z=1 TO LEN C$
250 PRINT CHR$ (CODE C$(Z)+1);
260 NEXT Z
```


Solve your LOADing problems!
Duplicate any TS/ZX Cassette
... and more!
with
WINKY BOARD II
CASSETTE COMPUTER INTERFACE

For your
TS 1000, ZX 81/80
actual size 1 X 1½"

- User friendly. Just plug into cassette player and computer
- Complete directions for multiple uses
- Protective case included

$19.95 assembled $14.95 kit $1 shpng
MasterCard/Visa 1-814-364-1325
G. RUSSELL ELECTRONICS
RD 1 • BOX 539 • CENTRE HALL, PA 16828
FREE information and list of utilities on cassette on request.
*Pa add 6% sales tax

TWO HIGH SPEED LOADING AND SAVING SYSTEMS FOR TAPES by Dave Miller

Fastload

Fastload is a machine language program that uses memory locations 31512 to 32767. It requires 16 K of memory. The Fastload program, with its BASIC instructions, takes 2 minutes to load. I deleted some instructions in my version and got it to load in 1 minute 15 seconds. Because it takes three instructions from the keyboard, or in a program, to execute the Fastload function, it is a little cumbersome to use at first. On the reverse side of the Fastload tape is a shortened bootstrap loader that loads the program which follows it. The one on my tape did not load. However, it was possible to make my own bootstrap loader with the instructions provided.

Fastload is selectable at four to six times faster than normal load and save rates. Since you must load Fastload first, it takes longer to load or save than 1/4th or 1/6th the normal time. For example, if it takes 6 minutes for the normal load, then it takes 1 minute 30 seconds plus 1 minute, or a total of 2 minutes 30 seconds, at four times the normal loading speed. Unfortunately, there is no 64 K version of Fastload. Large programs would benefit most from Fastload. And since Fastload itself takes up about 1/2 K, you can't use it for programs bigger than 15 1/2 K.

QSAVE

There are two versions of QSAVE--a 16 K version and a 64 K version. The 16 K versions starts at memory location 32000 and ends at 32432. Locations 32433 through 32767 are not used. The 64 K version starts at 8300 and ends at 8731. This version has an address error. **POKE 8566,159** and **POKE 8567,33** to prevent program crashing. The last copy of QSAVE I bought came with a note that said it was compatible with a Centronics printer interface. But after loading the tape, I found the code was still located at 8300 through 8731, making it incompatible with my interface.

QSAVE uses BASIC to move the machine code from a REM statement to the appropriate memory locations. I deleted their BASIC and substituted a machine language routine saving 5 seconds. QSAVE normally loads in 50 seconds and loads/saves programs 16 times faster than normal. It is possible to make a bootstrap loader, but some difficulty could arise because of the filter. An example of QSAVE loading time is 50 seconds to load QSAVE plus 1 minute 30 seconds to load 48 K of program and data, for a total of 2 minutes 20 seconds. QSAVE has three user functions--load, save, and verify. Unfortunately, the verify function is not very useful.

QSAVE comes with a filter which must be used for loading. I encountered some difficulty loading regular tapes with the filter. Hence I installed a bypass switch. The first two QSAVE filters I purchased operated off the 9 Volt power supply, and had an on-off switch for the filter and computer. The third filter I purchased was battery operated. Since it is easy to forget to shut off the filter, I replaced the battery with a power jack similar to the first two units'. There is also a small difference in the circuit board of this third unit, but I have noticed no difference in the performance.

Recommendations

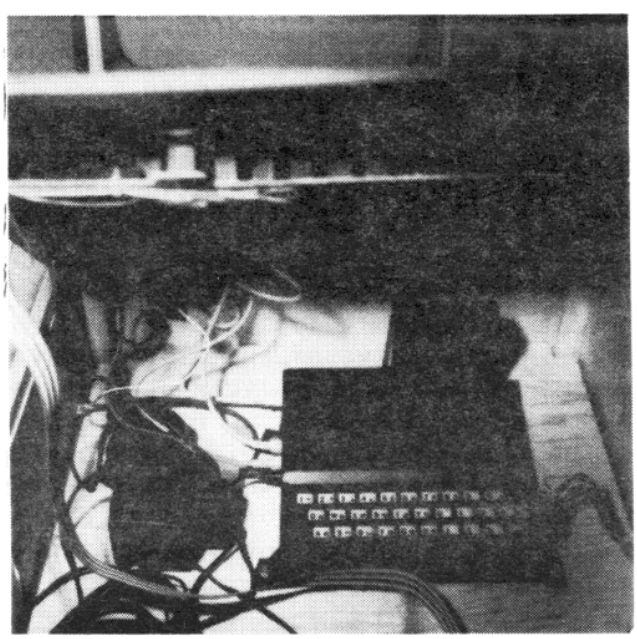
I recommend using either of the above programs if you have a good tape recorder. Regular cleaning of the tape heads and setting of the volume as per the instructions are important. Most likely you will not succeed at first or second try using either Fastload or QSAVE.

COMPUTER IN A DRAWER by A. W. Horlbeck

(This is the first in a continuing series on the systems our members play on.)

The night stand is a little 3-drawer pine unit. The top drawer has a false top, covered in green leatherette. It has been cut to size for: a surplus TI keyboard, purchased from Synchronize in Herville, Texas; a single-pole, single-throw rocker switch for power; a double-pole, double-throw rocker switch for SAVE/LOAD select; a neon power-on indicator light; and a small VU-meter for load volume control.

The television is a Philco 12-inch black and white model B437QWA; and the tape recorder, a Panasonic Model 2107A, about 5 years old. There is a four Ampere, 12.6 Volt, center-tap transformer which, rectified and filtered, provides the power for both the Sinclair ZX-81 (12.6 Volt) and the tape recorder (6.3 Volt center tap). It replaces the original plug-in transformers. The little tables on either side of the top drawer were made from scrap. They are useful for the tape unit and a notepad. Miscellaneous items store neatly in the otherwise empty second and third drawers.



DOES ANYBODY KNOW WHAT TIME IT IS?

Have you ever noticed how one program will run very fast and another seems to take forever? The time it takes to run the program is not always dependent on the number of iterations or the amount of data. This article will which address the question of execution time. Specifically, we will look at the relative amount of time required to do various computer operations. In addition to illuminating the black art of execution time, this information can be useful in programming real-time or process control applications.

The first table shows the time, in milliseconds (ms), to execute various functions. The definition of function given in the ZX-81 manual is "a rule for giving a number (the result) in exchange for another (the argument or operand)." Most functions in the ZX-81 or TS-1000 computer involve unary operations. That is, they take a single operand to produce the result. PI and RND are exceptions. They are nullary operations, not requiring an operand. The execution times were derived in the following manner. First, the time to compute "LET A=0+function" was computed. From this the time to compute "LET A=0+result" was subtracted. For example, for the ABS function, the time to do LET A=0+ABS 0 was computed. Then the time to do LET A=0+0 was subtracted, since 0 is the result of ABS 0. Note, although the square root function SQR appears fast, this really is not the case. It is only the result of the processing for the zero operand. SQR 1 takes 35.32 ms. USR 47 is a call to a location in ROM where a return instruction (C9 hex) may be found. It demonstrates the overhead of the USR function.

As expected, the evaluation of functions is quite slow when compared to the underlying speed of the processor. The Z-80 processor only requires 0.00123 milliseconds (or 1.23 microseconds) to do a typical arithmetic operation. These machine operations usually require four clock cycles. And the duration of a clock cycle is 0.000308 milliseconds (or 308 nanoseconds). This is the reciprocal of the clock frequency, 3.25 MHz.

Function	Time (ms)	Function	Time (ms)
(0)	0.18	USR 47	1.22
variable	0.36	RND	10.34
PI	0.46	SIN 0	37.08
ABS 0	0.48	EXP 0	39.78
NOT 0	0.50	COS 0	40.26
SGN 0	0.50	ATN 0	56.76
(-0)	0.60	LN 1	64.88
SQR 0	0.98	TAN 0	77.56
PEEK 0	1.06	ASN 0	166.88
INT 0	1.12	ACS 0	168.56

When PEEKing at memory, for example in a loop with PRINT PEEK I, you can notice that zero values get printed much more quickly than nonzero values. This is indicative of the fact that the value zero is represented by a unique set of symbols and receives special processing. Usually, a zero is represented by a floating point number with zero exponent, and the last four bytes of the number are ignored. The second table shows the time required for arithmetic operations involving the numbers one and zero. In this table, "|" stands for the operation, +,-,*, or /. In all cases, except for addition, operations involving zeros take significantly less time than the same operation without a zero operand.

	0|0	0|1	1|0	1|1
+	1.96	1.00	1.00	1.02
-	0.68	1.12	0.62	2.10
*	0.70	0.70	0.84	2.04
/	...	0.74	...	2.90

The third table shows the execution times for many commonly used statements. These times don't appear very large. But, when a program executes hundreds or thousands of lines, minutes or even hours can be consumed.

Statement		Time (ms)
FOR J=1 TO 1	NEXT J	10.88
FOR J=1 TO 10	NEXT J	54.52
FOR J=1 TO 10 STEP 2	NEXT J	29.50
GOTO 100		1.86
IF 1 THEN GOTO 100		2.72
IF 0 THEN GOTO 100		1.08
LET A=0		1.50
LET A=B		1.86
PLOT 10,10		4.34
POKE 10,10		1.94

How were the times actually measured? One way to get accurate timing of machine language programs (in this case the ROM routines) is to trace through the operation of the program and add up the times for each operation. The number of clock cycles (at 308 nanoseconds each) for each operation can be found in many Z-80 programming books. This method is slow, and prone to errors. It is possible to miscalculate the path, or branch, the computer will follow after a conditional jump. Such calculations are especially difficult for a program as complex as the Sinclair ROM.

The only practical way to get the execution times is to measure them. To get maximum accuracy, the operation to be timed should be put in a loop and executed many times. In this way, the timing error is divided by the number of iterations, so that the error per iteration is small. Still, if times are estimated manually, errors are likely. Great care must be taken so that the start and stop times are accurately measured.

The times quoted in these tables were obtained using a second computer (Cliff Danielson's homebrew) which was interfaced to the Sinclair. The second computer functioned as a clock. The Sinclair computer told the homebrew to begin the clock. The Sinclair would then perform 50,000 iterations of the function being tested, using a FOR...NEXT loop. Upon completion of the loop, the Sinclair computer asked the homebrew for the time. It then substracted the time required for the FOR...NEXT loop processing and printed the result. As a result, fairly accurate timing was possible.

INCREASE THE POWER OF YOUR TIMEX SINCLAIR 1000 with INTERCOMPUTER PACKAGES

We offer up to **20% DISCOUNT** for user Groups and Students on our Peripherals and Software in the areas of:

- Education
- Entertainment
- Utilities
- Home Management
- Programming Tools
- Word Processing

AND

- Memory Expansion RAMS
- Interface
- QSAVE-Quick Loading
- Printers
- Flexible Ribbon Connector
- High Resolution Graphics

AND MORE

NEW: Software on cartridges, Softbox, and Intercontroller
To order or for more information and free brochure, write or call Intercomputer, Inc. P.O. BOX 90, Prudential Center, Boston, MA 02199 Tel. (617) 437-1190

Coming soon: A full line of Software and Hardware for **Timex 2000** and other small computers.

ATT: Programmers, better royalties for your high quality programs

The original:

ZX-FORTH™

Don't Be Misled By Cheaper Imitations!

ZX-FORTH™, from **The Forth Dimension**, is the only full-function alternative language available for the **ZX-81 +TS/1000** computers. Just a few of the many functions that are part of **ZX-FORTH™** are: auto repeat keys, pixel graphics, customized backups and a full screen editor. Code written in **ZX-FORTH™** is easily transportable to any other **79-Standard Forth System**. Included with **ZX-FORTH™** is:

1. Comprehensive Users Manual;
2. 2 Sample Programs — **BREAKFORTH** — An arcade-type action game; SCRATCHPAD — A simple word processor.
3. **ZX—FORTH™** quick reference card.

ZX-FORTH™ 16K Cassette **$42.95**
Manual Only **$10.00**
+ $2 - Shipping & Handling
+ $7 - Shipping & Handling outside North America

The Forth Dimension
1451 N. Union Street
Middletown, PA 17057
Phone: (717) 944-6000

PA Residents Add 6% Pa. Sales Tax

Mastercard & Visa Accepted

LINE NUMBERS by Dave Wood

Did you know that you are not limited to 9999 BASIC lines. If you have enough memory for them, you can create up to 16383 lines. The system won't let you edit lines with statement numbers greater than 9999, but you can create these higher numbered lines by POKEing the line numbers into the BASIC line. These "high" BASIC lines are executable and listable. The line number after 9999 will LIST as A000. The highest line, 16383, will LIST as G383. GOTOs and GOSUBs to "high" lines work fine. Since you have to POKE the line number, a "high" line is most easily generated by entering it as the lowest line in your program, then POKEing the high byte, which is always located at 16509. Enter the following to observe how this works:

```
1)255 PRINT "TOP"      2)POKE 16509,63   3)254 PRINT "ALMOST"  4)POKE 16509,63
5)253 PRINT "AT THE"   6)RUN             7)9999 GOTO 16383     8)RUN
```

DOES ANYBODY REALLY KNOW WHAT DAY IT IS? by Jack Hodgson

Today is 6/13/83 or today is 6-13-83 or 061383. If all that's not difficult enough, some might say, "Today is 13/6/83!" Whatever way you say it, my question is: How many days ago was April 9? It be a lot easier to figure this out in a system where, for example, today were 10215 and a week ago 10208. Such a system does exist. It's called the Julian date system, not to be confused with the Julian calender. The date in a Julian date system is determined by the number of days from a base date. For example, if March 1, 1900 is Julian 0, March 5, 1900 is 4, April 1, 1900 is 31, and so on. The advantages of this system are that it is much easier to compare dates, put them in order, calculate the days between two dates, etc.

DAY -- Continued

Below is a routine that will convert a conventional date to a Julian date. March 1, 1900 is used as the base date because it helps simplify some of the problems caused by leap years. Unlike other years divisible by four, 1900 is not a leap year (neither is 2000). Oh, by the way, June 13, 1983 is 30419 and April 9, 1983 is 30354. There are 65 days between the dates.

```
 10 PRINT "TO COMPUTE JULIAN DATE
    (BASE=1 MARCH 1900) YEAR? ";
 20 INPUT YR
 30 PRINT YR
 40 PRINT "MONTH? ";
 50 INPUT MTH
 60 PRINT MTH
 70 PRINT "DAY? ";
 80 INPUT DAY
 90 PRINT DAY
100 LET Y=YR-1900
110 IF MTH>2 THEN GOTO 170
120 LET MTH=MTH+9
130 LET Y=Y-1
140 LET JDATE=INT ((1461*Y)/4
    +(153*M+2)/5+DAY-1)
150 PRINT MTH;"/";DAY;"/";YR;
    " = JULIAN DATE ";JDATE
160 STOP
170 LET M=MTH-3
180 GOTO 140
```


How will you take your SYNTAX/Syntax Quarterly?

The Combination—12 issues SYNTAX, 4 issues SQ	$39
The Catch-up—SYNTAX Jan. 82-Dec. 83, SQ Nov. 82 Nov. 83 (5 issues), 1 binder	$77
The **Works**—SYNTAX Nov. 80-Nov. 83, SQ Nov. 82-Nov. 83 (5 issues), 2 binders	$97
12 issues of SYNTAX	$29
4 issues of SQ, Syntax Quarterly	$15
1 issue SQ ☐ Winter ☐ Spring ☐ Summer	$ 4.95
1 Magazine binder to hold your SYNTAX or SQ	$ 9

To order or request more info, call 617/456-3661. Or write SYNTAX/SQ, RD 2 Box 457, Harvard, MA 01451.

SYNTAX/Syntax Quarterly for Timex Sinclair computer users.

announcing

*** ZX PRO/FILE ***
a 16K+ file manager for the Timex

ZX PRO/FILE is a machine language data base that gives you tremendous versatility:

*instant access to any file stored in memory
*files of any size in the same program run
*single or multiple word search capabilities
*ordered file displays
*comprehensive programmable printer functions

A 59 page manual comes with the cassette. In it are complete instructions, examples, directions for upgrading to larger memories, modifications, program listings, and a detailed explanation of how the program works. There's even an introduction to machine coding for beginners.

ZX PRO/FILE is the best file manager you can get for your Timex. In fact, users report that it provides data handling functions found only on the most sophisticated systems.

Price: just $16.95

Let me send you full specifications. Write to:

Thomas B. Woods
P.O. Box 64, Jefferson, NH 03583
Phone: (603) 586-7734

timex sinclair user

The NEW independent magazine for the ZX81, T/S1000

Guarantee
If ever you feel TIMEX SINCLAIR USER isn't helping you get the most from your computer, you may cancel your subscription and we will refund the value of all unmailed issues — and you may still keep your Packrabbit!

BONUS OFFER
Free "Packrabbit"
Retail value $15.00
A good reason to order now! Receive a software program cassette of an exciting, new arcade game! "Packrabbit" is a regular $15.00 retail value. Free with subscriptions for a limited time only.

Phone
★ 1-800-543-3000 ★
Operator 243
Have your VISA or MASTERCARD ready!

Mail to: Subscriptions Timex Sinclair User 49 La Salle Ave., Buffalo, N.Y. 14214-1414

Please print

NAME _____

STREET _____

CITY _____

STATE _____ ZIP _____

Bill me
MONEY ORDER
Check
VISA
MASTERCARD

One year
$29.95
(12 issues)

Expires _____

Card # _____

Signature _____

BCS

SERIOUS PROGRAMMERS

"MUST-HAVE" UTILITIES
For ZX-81 and T/S 1000 Computers

FILE*SYS	(fast, flexible, reliable) Read/Write Cassette Data Tape Files	$10
FILE*BASIC	(includes FILE*SYS functions) Save/Merge/Erase BASIC Segments	$15
FILE*VARS	(requires FILE*SYS or *BASIC) Save/Restore Strings & Arrays	$ 5
BASIC*OLAY	(permits full use of 64K RAM) Overlay/Copy BASIC Segments	$10
COPY*	(duplicates protected tapes) Copy Standard Cassette Tapes	$10
HEXAS*	(generates relocatable code) Symbolic Hex Assembler – (in BASIC)	$10
LOGIC*	(provides true logic functions) AND, OR, XOR, NOR, NAND, NOT	$ 5

- Simple user interface via USR function
- Well-documented user manuals
- On tape cassette in relocatable machine language

SiriusWare

Check or MO delivers now
SASE for info.

6 Turning Mill Road, Lexington, MA 02173

MACHINE LANGUAGE GROUP MEETS

The Sinclair-Timex machine language special interest group met for the first time on July 6th. In attendance were nine enthusiast users of Sinclair or Timex computers. At the meeting, Bob Heath demonstrated his computer system and some of the machine language software he has written. This provided the focus for discussions about many aspects of Z-80 machine language programming, the use of the subroutines on the Sinclair ROM, and hardware modifications to the computer.

Bob has a very impressive system. Built around a ZX-81 computer, his system features a large keyboard, real-time clock, analog-to-digital converter, and parallel input/output (I/O) capabilities. He demonstrated many of his program development tools, including programs for easy entry, display, and movement of machine language code, and a disassembler. He also demonstrated a program he developed for controlling lights in his house. This program featured table driven software to turn house lights off and on. The lights can be controlled either according to the time of day or the lighting conditions as sensed by a photocell (interfaced to his analog-to-digital converter). Bob can use different criteria for controlling each light on each day of the week. To actually turn the lights off and on, he has interfaced a Sears BSR Home Control System to the parallel I/O ports of his computer.

The next meeting for the group will be in August. A meeting is planned for September also. The meetings will be held at 7:00 p.m. on the first Wednesday of the month at ITEK Optical Systems in Lexington. Anyone interested in machine programming or hardware modification to the computer are encouraged to attend. Contact Bob Heath for details and directions. He can be reached during the day at (617) 276-2424.

REVIEW OF GRAPHICS KIT by Burt Fisher

The comments on this item of software must be prefaced by the fact that the reviewer lives in computer isolation (Cape Cod) and my vocation is broadcasting which is not exactly synonomous with logic. Graphics Kit loaded on the first try, so I knew I had a rare find. The most valuable part of this program is not the program, but rather the DEMO which is also included on the tape. The DEMO quickly shows the full range of capabilities in the main program. If VUCALC had a similar demonstration, I would not have had to spend the first part of my life trying to figure it out.

Graphics Kit resides above RAMTOP and consumes about 2 K of memory. It consists of 23 machine code routines and may be used in your BASIC program by the use of POKE and USR instruction. It even has its own error code. Among the capabilities of Graphic Kit are: instant borders on and off, instant foreground and background, scrolling in four directions, and draw and undraw of a multicharacter shape. Although the instructions are not very clear, they far outdistance Timex software instructions. However, a magnifying glass would have been helpful for reading them. Graphics Kit opens many possibilities and it will be an asset to many programmers. It costs $14.95 and is available from Softsync, Inc.

TAPE HINT: Mark Tepper, a BCS member in New York State, sent in the following hint regarding tape loading. Adjust the azimuth of your recorder by sticking a Philip's head screwdriver down the small hole near the tape read head and turning in either direction until the tape sounds clearest or the volume is loudest. (CAUTION: this may affect whether previously saved tapes will load.) Mark is interested in starting a user group in the Finger Lakes Region of New York. Write to him at 67 North Main Street, Geneva, New York 14456.

TIMEX 1000

BUSINESS

Budgeting	$9.95
Inventory Control	$9.95
Financial Analyzer	$9.95
Stock Analyzer	$9.95
Critical Path Analyzer ..	12.95
Bookkeeping	14.95

GAMES

Leap Frog	$9.95
Star Voyage	$9.95
Fungaloids	$9.95
Invaders	$9.95
Chess	$9.95
Snakebite	$9.95
Packman	$9.95

UTILITY

Assembler	$9.95
Disassembler	$9.95
Compiler	$9.95
Graph	$9.95

AND MANY MORE EXCITING PROGRAMS

CALL FOR FREE CATALOG

Shipping extra. No tax out of state.

DISCOUNT SOFTWARE, INC.

RCU PO BOX 2530, New York, NY 10185
Tel:(212)486-0980

IT'S HERE!!
The keyboard you have been waiting for!

A LARGE 60 KEY TACTILE FEEL KEYBOARD (MEASURES 10" x 4") THAT PLUGS INTO THE SAME CONNECTORS AS EXISTING KEYBOARD ON YOUR ZX81 OR TIMEX SINCLAIR 1000. IT HAS ALL SILKSCREENED LEGENDS IN 3 COLORS ON THE BASE; MOLDED LEGENDS & GRAPHICS ON KEY TOPS; 8 AUTOMATIC SHIFT KEYS (NO SHIFTING REQUIRED) FOR EDIT, DELETE, SINGLE & DOUBLE QUOTES, COLON, SEMI-COLON, FUNCTION & STOP; 5" SPACE BAR; 2 SHIFT KEYS; NUMERIC KEY PAD.

ONLY $84.95

MASS. RESIDENTS ADD 5% SALES TAX
SHIPPING & HANDLING $4.00/UNIT

QUANTITY DISCOUNTS. WE WILL ACCEPT MC/VISA. PLEASE INCLUDE #'S, EXP. DATE AND SIGNATURE. FOR MORE INFORMATION SEND SASE. SEND INQUIRIES, CHECK OR MONEY ORDER TO:

E-Z KEY
SUITE 75
711 SOUTHERN ARTERY
QUINCY,MA 02169

FOR MORE INFORMATION

Sue Mahoney, Director of the Sinclair-Timex User Group
c/o The Boston Computer Society or call (203) 573-5816.

Jack Hodgson, Publisher
P.O. Box 526, Cambridge, MA 02238, (617) 354-7899.

Cliff Danielson, Editor
14 Davis Road, Chelmsford, MA 01824, (617) 256-4638.

John Kemeny, Contributing Editor and User Group Correspondent
284 Great Road, Apt. D5, Acton, MA 01720.

Beth Elliott, Librarian.

Allan Cohen, Meeting Coordinator, (617) 961-3453.

ADVERTISING INFORMATION
Computer Related Products and Services Only
Open Rate: $40 per Quarter Page
For Rate Card and Discount Information Contact the Publisher

DIRECTIONS TO THE MEETING: The Sinclair-Timex User Group meets in the Large Science Auditorium (Room 8/2/009) of the University of Massachussetts of Boston, Harbor Campus. The Harbor Campus is only 3 miles from downtown Boston and easily accessible by public and private transportation. From the north or west, take the Southeast Expressway to Exit 17. Turn left onto Columbia Road. Enter the rotary and take the first right (Morrissey Boulevard). Bear right on the traffic island, following UMass/Boston sign. Turn left into the Campus. From the south, take Morrissey Boulevard northward to the campus. On the MBTA, take the Red Line (Ashmont Train) to Columbia Station. Transfer to the free University shuttlebus in the T parking lot.

The Boston Computer Society

Three Center Plaza
Boston, MA 02108
617-367-8080